

AMENDMENTS TO THE CLAIMS

Listing of claims:

This listing of claims replaces all prior versions and listings of claims in the application.

Claim 1 (Currently Amended): A semiconductor device comprising:

an insulating film formed over a semiconductor substrate;

an adhesive layer made of alumina formed on the insulating film;

a capacitor lower electrode formed on the adhesive layer;

a ferroelectric layer formed on the capacitor lower electrode, and having an ABO_3 perovskite structure that contains Ir in at least one of an A site and a B site (A=any one of Bi, Pb, Ba, Sr, Ca, Na, K, and a rare earth element, B=any one of Ti, Zr, Nb, Ta, W, Mn, Fe, Co, and Cr); and

a capacitor upper electrode formed on the ferroelectric layer,

wherein roughness of an upper surface of the adhesive layer is 0.79 nm or less.

Claim 2 (Original): A semiconductor device according to claim 1, wherein a (111) orientation of the ferroelectric layer has an inclination of 3.5° or less from a perpendicular direction of an upper surface of the semiconductor substrate.

Claim 3 (Original): A semiconductor device according to claim 1, wherein the ferroelectric layer is material that has PZT as a main component.

Claim 4 (Original): A semiconductor device according to claim 1, wherein a (111) orientation of the lower electrode has an inclination of 2.3° or less from the perpendicular direction of the upper surface of the semiconductor substrate.

Claim 5 (Original): A semiconductor device according to claim 1, wherein the lower electrode is made of platinum.

Claim 6 (Canceled)

Claim 7 (Canceled)

Claim 8 (Original): A semiconductor device according to claim 1, wherein the upper electrode is made of iridium oxide or iridium.

Claim 9 (Currently Amended): A semiconductor device comprising:
an insulating film formed over a semiconductor substrate;
an adhesive layer made of alumina formed on the insulating film and having a surface roughness of 0.79 nm or less;

a capacitor lower electrode formed on the adhesive layer, and having a (111) orientation that is inclined from a perpendicular direction of an upper surface of the semiconductor substrate by 2.3 ° or less;

a ferroelectric layer formed on the capacitor lower electrode, and having an ABO₃ perovskite structure (A=any one of Bi, Pb, Ba, Sr, Ca, Na, K, and a rare earth element, B=any one of Ti, Zr, Nb, Ta, W, Mn, Fe, Co, and Cr); and

a capacitor upper electrode formed on the ferroelectric layer.

Claim 10 (Original): A semiconductor device according to claim 9, wherein a (111) orientation of the ferroelectric layer is inclined from a perpendicular direction of an upper surface of the semiconductor substrate by 3.5 ° or less.

Claim 11 (Cancelled)

Claim 12 (Original): A semiconductor device according to claim 9, wherein the lower electrode is made of any one of a platinum layer, an iridium layer, a platinum-containing layer, and an iridium-containing layer.

Claim 13 (Original): A semiconductor device according to claim 9, wherein the ferroelectric layer is made of material that contains PZT as a main component, or PZT.

Claim 14 (Original): A semiconductor device according to claim 9, further comprising:
a hole formed in the insulating film and the adhesive layer under the lower electrode;
and
a conductive plug formed in the hole and connected to the lower electrode.

Claim 15 (Original): A semiconductor device according to claim 14, wherein an oxygen barrier metal layer is formed between the conductive plug and the lower electrode.

Claim 16 (Original): A semiconductor device according to claim 15, wherein the oxygen barrier metal layer constitutes a part of the lower electrode.

Claims 17 - 32 (Cancelled)

Claim 33 (Previously Presented): A semiconductor device according to claim 2, wherein a (111) orientation of the lower electrode has an inclination of 2.3° or less from the perpendicular direction of the upper surface of the semiconductor substrate.